## IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1  1. (Original) A read channel, comprising:

2  an equalizer configured to equalize a digital signal to provide equalized

3 reproduced signals; and

4  a Viterbi detector capable of receiving the equalized reproduced signals and

5 converting the reproduced signals into a digital output signal indicative of data stored on

6 a recording medium;

7  wherein the equalizer is implemented using a lengthened equalization target

8 wherein the lengthened equalization target comprises a mathematical convolution of a

9 first and a second transfer function, the first transfer function comprising a predetermined

10 equalization target for providing desired shaping to the read signal and the second

11 transfer function comprising a matched filter function providing a time-reversed

12 component that is a time-reversed replica of a whitening filter component of the

13 equalization target.

1  2. (Original) The read channel of claim 1, wherein the predetermined

2 equalization target comprises a 16-state equalization target having a length of 7.

1  3. (Original) The read channel of claim 1, wherein lengthened

2 equalization target is symmetrical and comprises only two programmable parameters.

1    4.    (Original)    The read channel of claim 1, wherein coefficients of the

2    lengthened equalization target are independently adjustable while maintaining a DC null

3    and a desired Nyquist null.


1    5.    (Original)    The read channel of claim 1, wherein the lengthened

2    equalization target comprises a base partial response component, a fractional coefficient

3    polynomial component and a time-reversed replica of the fractional coefficient

4    polynomial component.


1    6.    (Original)    The read channel of claim 1, wherein the lengthened

2    equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.


1    7.    (Original)    The read channel of claim 1, wherein the lengthened

2    equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to $(p1/p2) +$

3    p1 and b is equal to $((p_1^2+1)/p_2)+p_2-1$.


1    8.    (Original)    The read channel of claim 7, wherein a and b are

2    programmable.

1    9.    (Original)    A signal processing system, comprising:

2    memory for storing data therein; and

3    a processor, coupled to the memory, for equalizing a digital signal to provide

4    equalized reproduced signals using a lengthened equalization target, wherein the

5    lengthened equalization target comprises a mathematical convolution of a first and a

6    second transfer function, the first transfer function comprising a predetermined

7    equalization target for providing desired shaping to the read signal and the second

8    transfer function comprising a matched filter function providing a time-reversed

9    component that is a time-reversed replica of a whitening filter component of the

10   equalization target.

1    10.    (Original)    The signal processing system of claim 9, wherein the

2    predetermined equalization target comprises a 16-state equalization target having a length

3    of 7.

1    11.    (Original)    The signal processing system of claim 9, wherein

2    lengthened equalization target is symmetrical and comprises only two programmable

3    parameters.

1    12.    (Original)    The signal processing system of claim 9, wherein

2    coefficients of the lengthened equalization target are independently adjustable while

3    maintaining a DC null and a desired Nyquist null.

1      13.    (Original)    The signal processing system of claim 9, wherein the

2    lengthened equalization target comprises a base partial response component, a fractional

3    coefficient polynomial component and a time-reversed replica of the fractional

4    coefficient polynomial component.


1      14.    (Original)    The signal processing system of claim 9, wherein the

2    lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.


1      15.    (Original)    The signal processing system of claim 9, wherein the

2    lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal

3    to $(p1/p2) + p1$ and b is equal to $((p_1^2+1)/p_2)+p_2-1$.


1      16.    (Original)    The signal processing system of claim 15, wherein a and b

2    are programmable.


1      17.    (Original)    An equalizer implemented in accordance with a lengthened

2    equalization target wherein the lengthened equalization target comprises a mathematical

3    convolution of a first and second transfer function, the first transfer function comprising a

4    predetermined equalization target for providing desired shaping to the read signal and the

5    second transfer function comprising a matched filter function providing a time-reversed

6    component that is a time-reversed replica of a whitening filter component of the

7    equalization target.

1    18.    (Original)    The equalizer of claim 17, wherein lengthened equalization

2    target is symmetrical and comprises only two programmable parameters.


1    19.    (Original)    The equalizer of claim 17, wherein coefficients of the

2    lengthened equalization target are independently adjustable while maintaining a DC null

3    and a desired Nyquist null.


1    20.    (Original)    The equalizer of claim 17, wherein the lengthened

2    equalization target comprises a base partial response component, a fractional coefficient

3    polynomial component and a time-reversed replica of the fractional coefficient

4    polynomial component.


1    21.    (Original)    The equalizer of claim 17, wherein the lengthened

2    equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.


1    22.    (Original)    The equalizer of claim 17, wherein the lengthened

2    equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal to $(p1/p2) +$

3    p1 and b is equal to $((p_1{}^2+1)/p_2)+p_2-1$.


1    23.    (Original)    The equalizer of claim 22, wherein a and b are

2    programmable.

1        24.        (Original)        A magnetic storage device, comprising:

2        a magnetic storage medium for recording data thereon;

3        a motor for moving the magnetic storage medium;

4        a head for reading and writing data on the magnetic storage medium;

5        an actuator for positioning the head relative to the magnetic storage medium; and

6        a data channel for processing encoded signals on the magnetic storage medium,

7        the data channel comprising an equalizer implemented in accordance with a lengthened

8        equalization target wherein the lengthened equalization target comprises a mathematical

9        convolution of a first and second transfer function, the first transfer function comprising a

10       predetermined equalization target for providing desired shaping to the read signal and the

11       second transfer function comprising a matched filter function providing a time-reversed

12       component that is a time-reversed replica of a whitening filter component of the

13       equalization target.


1        25.        (Original)        The magnetic storage device of claim 24, wherein the

2        predetermined equalization target comprises a 16-state equalization target having a length

3        of 7.


1        26.        (Original)        The magnetic storage device of claim 24, wherein

2        lengthened equalization target is symmetrical and comprises only two programmable

3        parameters.

1      27.    (Original)    The magnetic storage device of claim 24, wherein

2    coefficients of the lengthened equalization target are independently adjustable while

3    maintaining a DC null and a desired Nyquist null.

1      28.    (Original)    The magnetic storage device of claim 24, wherein the

2    lengthened equalization target comprises a base partial response component, a fractional

3    coefficient polynomial component and a time-reversed replica of the fractional

4    coefficient polynomial component.

1      29.    (Original)    The magnetic storage device of claim 24, wherein the

2    lengthened equalization target has the form $(1-D^2)(1+p_1D+p_2D^2)(p_2+p_1D+D^2)$.

1      30.    (Original)    The magnetic storage device of claim 24, wherein the

2    lengthened equalization target has the form $(1+aD+bD^2-bD^4-aD^5-D^6)$, wherein a is equal

3    to $(p1/p2) + p1$ and b is equal to $((p_1^2+1)/p_2)+p_2-1$.

1      31.    (Original)    The magnetic storage device of claim 30, wherein a and b

2    are programmable.

1        32.      (Currently Amended) An equalizer implemented in accordance with

2    means for shaping a channel impulse response ~~to a desired target shape~~ to a lengthened

3    equalization target, wherein the means for shaping comprises ~~a first means for~~ means for

4    convoluting a first and a second transfer function, wherein the first transfer function

5    comprising a predetermined equalization target for providing desired shaping to the read

6    signal and ~~a second means for~~ the second transfer function comprising a matched filter

7    function providing a time-reversed component that is a time-reversed replica of a

8    whitening filter component of the ~~means for shaping~~ lengthened equalization target.